

Characterizing natural vs. human-related change in Puget Sound deltaic habitats

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Biologically productive and geologically dynamic deltaic environments are experiencing rapid deterioration due to alterations of stream flow, sediment delivery, and water quality. The Skagit River/Delta, supporting the largest salmon run of Puget Sound's rivers and habitat for all five Pacific salmon species has sustained ~70% loss of salmon rearing habitat since the 1880s due to land clearing, damming, diking, and wetland drainage. By combining geophysical mapping and sedimentologic analyses we are reconstructing rates and modes of change in marsh-channel and eelgrass habitats to better understand the magnitude of recent habitat loss and the biogeophysical processes needed to sustain it. A sediment budget and conceptual model of recent delta evolution shows spatial and temporal variations in sediment lithology and accumulation history. They will be used to characterize past habitat distribution, sediment deposition and transport processes, and to predict future environmental change associated with landscape alteration including restoration. Preliminary results indicate (1) sediment accumulation rates in salt marsh settings increased significantly after ~1850, (2) fluvial sediment bypassing of Fir Island due to diking is currently burying and scouring eelgrass meadows, and (3) local reductions of sediment supply and/or relative sea-level rise is rapidly eroding the central Fir Island coast stranding marsh offshore.